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" A Day at the Cupola "

This was the title of a paper read by the late Mr. A. R. Bartlett to the Institute of British Foundrymen, about a quarter of a century ago. It gave a wealth of practical information, based on lengthy experience and no doubt represented the best practice then available.

A different kind of " a day at the cupola " was staged last week at the offices of the Iron and Steel Institute, when a joint meeting with the Institute of British Foundrymen was held to examine, critically, three reports prepared by a sub-committee of the latter organisation. Mr. D. Howard Wood presided and he well designated the work done, as being a springboard for future work to be undertaken by the British Iron and Steel Research Association. Mr. L. W. Bolton introduced the three reports and replied to most of the queries raised. His task, though arduous, was brilliantly accomplished. We expect to publish, in the near future, a full report of the day's work.

In the meantime, we have deemed it advisable to outline the impressions we received. The basic cupola, which shows potentialities for both sulphur and phosphorus reduction, first seemed to have but little practical interest, as after all, sulphur reduction could be carried out in the ladle by means of the soda ash process, whilst the phosphorus reduction was " chancy." Still, it had proved itself of real value for melting the ferro-manganese used for making manganese steel. The complexity, of the problems of the industry, was well illustrated when a manufacturer of white heart malleable pointed out that the soda ash process was useless to him as a solution of a difficulty to be associated with the necessity to cast very small articles, requiring unusually hot metal, with an ever-increasing sulphur content in raw materials. The basic cupola did provide at least a technical solution. Then the question of the daily patching of cupolas arose and here Mr. Bolton told the story of how one foundry owner had eliminated this by the installation of steel water coolers in the tuyere area. It functioned well for the melting of iron scrap pig-iron mixtures, but with heavy steel additions metal froze on to the steel plate, thickened it, and the furnace became unmanageable. A point very clearly brought out was that desulphurising requires a basic slag and reducing conditions, whereas dephosphorising requires oxidising conditions. The latter exist round the tuyeres, whilst the former is provided by contact with the incandescent coke bed. Thus it seems, that for good dephosphorisation, continuous tapping is a prime requisite. It is this particular phase which fascinates the steel maker, because a cheap method of phosphorus reduction before steel making in the basic open hearth, might enable him to reduce the slag to metal ratio from 30 to 10 per cent.—the economics of which are obvious. The iron-foundry was praised by the steel makers for the great progress made with the soda ash process and the iron makers were criticised for their backwardness. The founders, however, came in for adverse comment, however, for relating their efficiencies to the sulphur reduction in the metal, quite disregarding the amount of soda ash used. We were told that a hundred pounds of soda ash should remove 30 lb. of sulphur, but there were few cases where soda ash was being used really economically, yet it is a material very much in short supply.

So much information was disclosed during this " day at the cupola," that we hope it will be the forerunner of many more meetings between the two industries, as it was obvious that they have much to learn from each other.

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Forthcoming . . . . . Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

MARCH 31.

Scottish Engineering Students' Association :—" Production of Sound Iron Castings," by Joyce McFarlane, B.Sc., at Institution of Engineers and Shipbuilders, Glasgow, at 7.15 p.m.

APRIL 3.

Institute of Production Engineers (Nottingham Branch) :—" History of the Large Internal Combustion Engine," by H. J. Gibbons, at Victoria Station Hotel, Nottingham, at 7 p.m.

Institute of British Foundrymen

MARCH 29.

London Branch :—" Cupola Operation Precept and Practice," by C. A. Payne. At Waldorf Hotel, at 2.30 p.m.

Notes from the Branches

Wales and Monmouthshire

The subject for discussion at the February meeting was presented in the form of a sound film, "The Production of High Quality Steel," when Mr. W. H. Salmon, of Hadfields, Limited, Sheffield, at whose works the film was made, was present to deal with questions. At the conclusion, Dr. Bryn Jones moved a vote of thanks to Mr. Salmon and Hadfields, Limited. The film he described as an excellent piece of photography, in exhaustive detail, of great interest to the meeting, particularly those engaged in the steel industry. Mr. Harold Davies seconded and Mr. Salmon replied briefly.

For the convenience of West Wales members the film was shown at the Glanmor Foundry Canteen, Llanelly, on February 19. The attendance on this occasion exceeded that at Cardiff, there being more than 200 present, invitations having been sent to members of local steel and tinplate trades.

On the motion of Mr. Craig, seconded by Mr. Thomas, a very hearty vote of thanks was accorded Mr. Salmon and his firm for a most interesting and instructive film, covering every process in the production of high quality steel. Local steel works did not require such intensive control as that illustrated. However, the interest of those engaged in the industry locally was indicated by the excellent attendance.

The meeting accorded a vote of thanks to Mr. Gordon Rees and the Glanmor Company for providing facilities to enable them to spend such an interesting and enjoyable evening.

East Anglia

This month's meeting at Ipswich on March 13, with Mr. A. F. Hammond in the chair, mustered 52 despite the neighbouring floods, which prevented Braintree members from attending.

The Secretary announced that the annual general meeting would be held on Thursday, April 10, at

(Continued at foot of next column)

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

CIRCULATION OF POOR PATTERN EQUIPMENT

To the Editor of THE FOUNDRY TRADE JOURNAL.

SIR,—May I appeal through your columns to those foundries to whom it concerns to show their reluctance to continue production off pattern equipment which is not correct. It is unfair, to say the least, for such equipment to " go the rounds " from foundry to foundry leaving a trail of scrap, lost time, bad feeling and reduced confidence in its wake.

So often does it occur that the first one or two off such a job end in the scrap bin. Subsequent castings are " cured " by temporary measures such as filing cores, etc., and the pattern equipment with many years of life ahead of it remains uncorrected.

Where many previously worked patterns and coreboxes are received it becomes uneconomic to check them all, and the fact that they have obviously been worked before provides their passport to shame.

In no way is this an indictment of the pattern-making part of the industry—they are allowed a minimum percentage of error and would without doubt correct this if such cases were brought to their notice at birth.—Yours, etc.,

LEONARD CLARKE,
Quality Manager,
John Harper & Company, Limited, and
John Harper (Meehanite), Limited,
Albion Works,
Willenhall.

March 19, 1947.

Hot-rolling of Iron Carbon Alloys

Prof. Piwowarsky has written to point out two errors in translation which occurred in his article published in the FOUNDRY TRADE JOURNAL for February 6, pp. 125 to 132. They are:—

(1) Page 127, fifth line from the bottom of the page, should read " rolling became more difficult," instead of " rolling became easier."

(2) Page 129, line 1 (Fig. 8) should read (Figs. 8 and 9).

These slips are greatly regretted, and we trust readers have suffered no serious inconvenience.

(Continued from previous column)

7.15 p.m. in the Library Lecture Hall, Ipswich, when officers would be elected for the next session. A " Foundry Inquest, Fault and Cure " on specimen castings provided by local foundries is to follow the proceedings.

The Hadfields' film, "The Production of High Quality Steel," was then shown and Mr. W. H. Salmon was in attendance to answer questions, and a lengthy discussion followed.

Institute of British Foundrymen

★ ANNUAL CONFERENCE ★

Nottingham — *June 17 to 20, 1947*

PROGRAMME

TUESDAY, JUNE 17

Council and Committee meetings will be held during the afternoon.

7.00 p.m. 'Buses depart from Victoria Station, Black Boy, County, Portland, George, Welbeck, and Flying Horse Hotels for:—

7.30 p.m. Civic Reception at Nottingham Castle, by kind invitation of The Lord Mayor and Corporation of the City of Nottingham.

11.00 p.m. (Buffet, dancing.) (All Members and Ladies.) (Evening dress.) Transport will be available to return guests to their hotels at 11.00 p.m.

WEDNESDAY, JUNE 18

9.30 a.m. Annual General Meeting at the Albert Hall Institute, Nottingham. (Members only). Presentation of Awards.

10.50 a.m. Presidential Address by Mr. P. H. Wilson, O.B.E., M.I.Mech.E.

11.45 a.m. Edward Williams' Lecture: "New Metals for Old," to be delivered by Sir Edward Appleton, K.C.B., M.A., D.Sc., F.R.S. (Secretary of the Dept. of Scientific and Industrial Research.)

1.00 p.m. 'Buses depart Albert Hall Institute to convey members to the Greyfriars Hall for Luncheon.

1.15 p.m. Luncheon at the Greyfriars Hall, Nottingham, by kind invitation of the East Midlands Branch. (Members and Ladies.)

2.10 p.m. 'Buses available to return members to the Albert Hall Institute for the Technical Sessions.

2.30 p.m. Technical Sessions at the Albert Hall Institute.

5.15 p.m. Conference adjourns.

6.30 p.m. 'Buses depart from the Victoria Station, Black Boy, County, Portland, George, Welbeck, and Flying Horse Hotels, to convey Members and Ladies to the Greyfriars Hall for the Annual Banquet.

6.45 p.m. Reception by the President and Mrs. Wilson prior to the Annual Banquet.

7.15 p.m. to 1.00 a.m. Annual Banquet at the Greyfriars Hall. Followed by dancing until 1.00 a.m. (Members and Ladies.) (Evening dress.) Transport will be available to convey guests to their hotels at 1.00 a.m.

THURSDAY, JUNE 19

9.15 a.m. Technical Sessions at the Albert Hall Institute.

12.30 p.m. Conference Adjourns. 'Buses depart Albert Hall Institute to convey members to the Greyfriars Hall for Luncheon.

12.45 p.m. Luncheon at the Greyfriars Hall. (Members and Ladies.)

1.45 p.m. Visit to the Stanton Ironworks Company, Limited. (Blast furnaces, concrete pipes, spun iron pipes, general castings.) 'Buses depart from the Greyfriars Hall. The visit will include inspection of most of the Company's works except the Holwell Foundry, which may be visited on Friday, June 20. Tea will kindly be provided by the Company. On return, 'buses will arrive at the Greyfriars Hall, Nottingham, at about 5.15 p.m.

8.15 p.m. Theatre. A limited number of seats have been reserved for Members and Ladies at the Empire Theatre for the second performance commencing at 8.15 p.m. Members and ladies make their own arrangements for meals and transport during the evening.

FRIDAY, JUNE 20

9.00 a.m. 'Buses depart from the Greyfriars Hall for the following works visits. Members may register for any one visit 1 to 7, and those registering for visits 5, 6 or 7 should also register for either of visits 8 or 9.

1. Worthington-Simpson, Limited, Newark (pump manufacturers), and Ruston & Hornsby, Limited, Lincoln (internal combustion engines and agricultural machinery).

Annual Conference

2. Worthington-Simpson, Limited, Newark, and Harrison & Company, Lincoln (black and whiteheart malleable ironfounders).
3. Lloyds (Burton), Limited, Burton-on-Trent (repetition and jobbing grey and high-duty iron castings) and Bamfords, Limited, Uttoxeter (agricultural engineers).
4. The Stanton Ironworks Company, Limited (Holwell Foundry) (Special pipes and pipe fittings) and S. Russell & Sons, Limited, Leicester (Machine tool and general engineering castings).

NOTE (*a*) Visits 1—4.—The first named Company will be visited in the morning and will kindly provide luncheon. The second company will be visited in the afternoon and will kindly provide tea.

5. Rolls Royce, Limited, Derby (light metals foundry) (morning only).
6. International Combustion, Limited, Derby (boiler house equipment) (morning only).
7. L.M. & S. Railway Research Laboratory, Derby (morning only).

2.00 p.m. After luncheon in Derby, 'buses will convey Members on Visits 5, 6, and 7, to the following works, which will kindly provide tea:—

8. Qualcast, Limited, Derby (light repetition ironfounders and automobile castings; permanent mould production of iron castings).
9. Ley's Malleable Casting Company, Limited, Derby (Blackheart malleable ironfounders).

NOTE (*b*) Visits 5—7. Each of these visits occupies the morning only. All members on these three visits will be conveyed to Derby, for luncheon, and after the visit and after lunch they may make visit 8 or 9.

On return from visits 1, 2, 3, 4, 8 and 9, buses will arrive at the Greayfriars Hall at about 5.00 p.m.

Evening free.

LADIES' PROGRAMME

TUESDAY, JUNE 17

7.00 p.m. 'Buses depart from Victoria Station, Black Boy, County, Portland, George, Welbeck, and Flying Horse Hotels for:—

7.30 p.m. to 11.00 p.m. Civic Reception at Nottingham Castle, by kind invitation of The Lord Mayor and Corporation of the City of Nottingham. (Buffet, dancing). (All members and Ladies.) (Evening dress.) 'Buses will be available to return guests to their hotels at 11.00 p.m.

WEDNESDAY, JUNE 18

Morning free for shopping, etc.

10.45 a.m. Coffee at the Mikado Cafe, 39, Long Row, Nottingham, at the invitation of the Ladies' Committee of the East Midlands Branch.

1.15 p.m. Luncheon at the Greyfriars Hall, by kind invitation of the East Midlands Branch. (Members and Ladies.)

2.15 p.m. 'Buses depart Greyfriars Hall for visit to Newstead Abbey. Tea will be taken at The Hut Hotel by kind invitation of Mrs. P. H. Wilson. On return, 'buses will arrive at the Greyfriars Hall at about 4.45 p.m.

6.30 p.m. 'Buses depart from the Victoria Station, Black Boy, County, Portland, Welbeck, and Flying Horse Hotels to convey Members and Ladies to the Greyfriars Hall for the Annual Banquet.

6.45 p.m. Reception by the President and Mrs. Wilson, prior to the Annual Banquet.

7.15 p.m. to 1.00 a.m. Annual Banquet, at the Greyfriars Hall, followed by dancing until 1.00 a.m. (Members and Ladies.) (Evening dress.) 'Buses will be available to convey guests to their hotels at 1.00 a.m.

THURSDAY, JUNE 19

10.00 a.m. 'Buses depart from the Greyfriars Hall for visits to the following works. As each visit occupies the whole morning, ladies may book for ONE only:—

1. J. B. Lewis & Son, Limited (Hosiery Manufacturers).
2. The British Lace Furnishings, Limited (Lace Makers).

After the visits the 'buses will return direct to the Greyfriars Hall for luncheon.

12.45 p.m. Luncheon at the Greyfriars Hall. (Members and Ladies.)

2.15 p.m. 'Buses depart Greyfriars Hall for visits to the following works. As each visit occupies the whole afternoon, ladies may book for ONE only:—

4. G. W. Price, Limited, Long Eaton (Lace Makers).
5. John Player & Sons, Limited (Cigarette Manufacturers).

On return, 'buses will arrive at the Greyfriars Hall at about 4.45 p.m.

8.15 p.m. Theatre. A limited number of seats have been reserved for members and ladies at the Empire Theatre for the second performance, commencing at 8.15 p.m. Members and ladies make their own arrangements for meals and transport during the evening.

FRIDAY, JUNE 20

9.30 a.m. 'Buses depart from the Greyfriars Hall for tour including Derby, Matlock, Chatsworth Park, Grindleford, Bamford, Derwent Dams, Baslow, Bakewell, and Haddon Hall. Luncheon will be taken at the Devonshire Arms Hotel, Baslow. Tea will also be provided. On return, 'buses will arrive at the Greyfriars Hotel at about 4.45 p.m.

(*Continued on page* 247.)

Patternmaking

A new machine for cutting irregular shapes*

By B. Levy

Selection of the ideal material for patterns has given rise to sharp differences of opinion by foundrymen, but practical experience has shown that wood is unquestionably the basic material upon which most patternmaking is founded, even though better substances may follow. Special patternshop equipment and machinery for working any kind of wood, metal, artificial-stone or plastic material to form a pattern, is generally left to the enterprise of the actual patternshop chief, subject, of course, to agreement with the spending department.

In view of these points, the individual responsible for equipment of the patternshop will, when the time arrives, generally look for machinery that is adaptable to the working of *wood* primarily, and as many other materials thereafter as is practically possible, within the limits of known cutting speeds, feeds and tools.

This is because the backbone of all patternmaking effort begins with the first class wood patternmaker who is (or should be) a man well versed with the pros and cons of practical application to the job in the foundry, and has good drawing knowledge in addition to his own practical proficiency.

It is not proposed to deal at length with all aspects of patternmaking now, the main object of this paper being, to reveal a little private enterprise which has some bearing on economical machining and easier production of patterns generally, and in particular, "irregular shaped work," which normally presents a difficult and laborious task of hand cutting.

It can be generally taken that free-cutting metals such as aluminium are applicable to the working of wood patterns as mainly pictured in the manufacturing facility now under preview, and it should also be mentioned that the apparatus envisaged has been designed mainly for wood-working, but with the same versatility in use on soft metals and the like.

Machines Available

As an introductory to the new apparatus, it is necessary to have a good idea of existing patternshop procedure and plant coupled with a working knowledge of facilities available for machining patterns, other than the assortment of lathes, planing, sawing and drilling machines used in common with other trades.

As an example it is proposed to take the well-known Wadkin pattern miller, which embodies practically all the essential features to be found in similar machines equally provided for patternshop use. In addition to pattern milling machines made especially for patternshop use there are other milling machines, suitable for many patternmaking jobs, each having a flexibility of application according to cost.

No doubt the machine *de-luxe* for metal patterns is the popular tool-room job made by the American Keller Company, available in quite a range of sizes and suited to close limit work. It is an elaborate machine, electrically controlled, ranging in price from £2,000 to £12,000.

Few concerns can afford to spend such large amounts on a machine like the Keller solely for patternshop use, especially as this machine is designed primarily for metal-cutting and may, perhaps, be too fine a tool and rather slow cutting for the average patternmaking job. The Author's experiments have been devoted to a mechanically operated machine, suited primarily for wood and very soft metals, simple to operate, low in initial cost and upkeep, and having a range of capabilities equal in its own class of work to the performance of more elaborate contemporaries.

The production of regular geometrical shapes such as circles, rectangles, rhomboids, triangles, cones, etc., and combinations of any of these, in part or whole, is comparatively simple on any good pattern miller, or similar machine, but it is a different proposition when the contemplated job is full of blended curves or irregular geometrical shapes such as in the following classes of work:—Motor car castings, marine devices, reducing elbows, propellor dies, artificial limb patterns, shaped vessels, aircraft work, and the like.

Typical Machine Work

Fig. 1 shows an actual job performed on the "mock-up" gear, first used for trying out the three dimensional working necessary for this and typical classes of work, and as is usual in a peculiar shape of this nature, was dimensioned through a series of ordinances or datum lines which could only be obtained by the use of many templates. This example has been chosen as a typically laborious and difficult shape to make, even for just one pattern. In actual fact, a few hundred of these "bodies" were easily and quickly manufactured from teak (by means of the new apparatus) to the close Admiralty specification seen in the drawing.

From the pattern-making and casting point of view, this would not be a particularly rare shape for many commercial engineering components such as motor and aircraft parts. It is well known by any patternmaker, that blended shapes and irregular geometrical sections

* A paper read before the London branch of the Institute of British Foundrymen, Mr. G. R. Webster presiding. The new machine is protected by Patent No. 581497.

Patternmaking

such as these normally represent a great expenditure of time as there is no alternative but the cut-and-try system of internal and external template employment.

This special body was manufactured on the usual lines of a jointed pattern; it was split longitudinally through its vertical centre line, as in a plate-mounted job. Each half-body, therefore, had only one flat face for affixing to the machine. See Figs. 2 and 3.

Fig. 3 shows how a set of templates were made, conforming to the datum and ordinances of the drawing, and screwed together to form the overall depth of the job in a series of steps, each step being a blending point.

This set-up is typical of the procedure necessary for machining irregular shaped work on this apparatus. It amounts to making external templates for each section of the drawing and clamping the complete set together, in their allocated position, using spacing pieces where required. The assembly of templates is then mounted on a copy table represented by item (6) in Fig. 2. Here it is necessary to explain the set-up of the apparatus as compared with an existing pattern miller. (See chain-dotted outlines in Fig. 4.)

The essential features to remember are the main rear column, the rise-and-fall main arm carrying the cutter head (which is adjustable from horizontal to vertical), and the set of work-tables having a slide action to and from the operator, towards the rear main column and back again, and a wide transverse adjustment available to right and left of the operator.

New Machine—Main Features

Starting from the base of the machine (see Fig. 4), there is an additional column (3) provided with a double set of rollers and a locking device at (4), the small rollers (shown dotted) contacting the bed of the existing machine and the large rollers (shown as a full line) for portability when this additional column is removed from the machine completely, and transferred to alternative position.

The additional column carries the pattern or template table (6), which is mounted on slides (5) and moved in a vertical direction up or down by the chain (11) running over idler pulleys (9) and (12). This template table is counterbalanced by weights (10), which are adjustable according to the size of work or weight of templates mounted on the table (6).

For purposes explained later, the chain (11) is attachable directly to the table (6) at a point adjacent to the upper position, and on this occasion would be disconnected from its lower position.

An auxiliary table arrangement (17 and 18), movable freely right or left, is mounted on top of the existing machine (7) and has a set of balance weights and chains (19, 20, 21) to provide means of urging this work table (18) towards the templates (26) having a roller of predetermined size on the arm (22) to ease friction when traversing the table and its follower past the templates.

The hand wheel (27) engages a gear and rack on the underside of table (18) to provide for relieving tension on the worktable (18), for example, when traversing close up to a right-angle shoulder on the templates. At (24) there is an angle plate of a special type bolted to the table (18) which carries work (23) and, immedi-

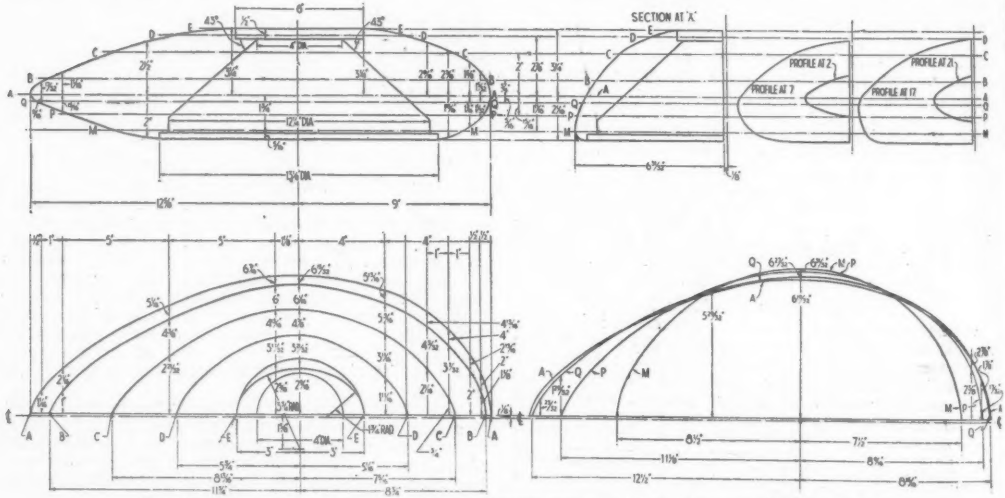


FIG. 1.—TYPICAL EXAMPLE OF PATTERN SHAPE FOR THE NEW METHOD OF MANUFACTURE.

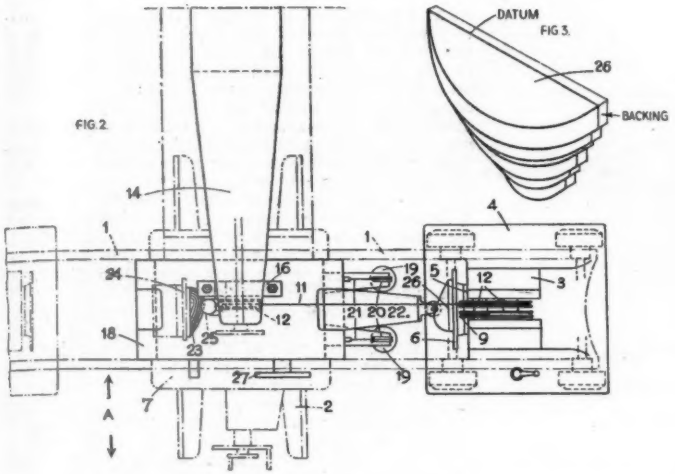


FIG. 2.—PLAN VIEW OF APPARATUS.

FIG. 3 (INSET).—TEMPLATE ASSEMBLY.

ately above this, the actual cutter-head and cutter (25). On top of the machine an auxiliary arm (14) is affixed, carrying an idler pulley (12) over which chain (11) from the auxiliary column (3) passes, and connects to the main cutter head (13). Item (16) is a method of attachment block to accommodate the chain fastening.

It will now be seen that, when the main arm of the machine is traversed up and down, the chain (11) being connected to the template table (6) will automatically cause it to move up and down in equal ratio (other ratios are possible by an elaborated apparatus). Thus, if the cutter moves down ¼ in., the template table can be made to move down an equal ¼ in. or, alternatively, if the chain connections are altered as previously provided for, the template table will move up the precise amount that the cutter moves down. This is rather an important feature, as by this means right- or left-hand work can be produced from the one set of templates.

Method of Cutting

Reverting to the set of templates prepared in the required manner (Fig. 3), it will be seen that the completed assembly has been affixed in form 26 to the template table 6.

In Fig. 2 at (23) there is a plan view of the work in progress, where it will be noted that cutting is performed in a series of grooves or ledges (similar to the templates in appearance), but depending on the type of cutter employed. In this instance, a plain square cutter was used (Fig. 5) to remove surplus material quickly, but the other circular cutters illustrated would have obvious advantages in appropriate cases.

The method of cutting is now extremely simple, the operator merely turns the small handwheel (shown chain-dotted at the bottom centre), which traverses the complete work and sliding tables past the cutter at 25 in direction of arrow "A" and the follower-arrangement 20 and 22 automatically moves the tables right and left, according to the contour of the templates or copy in contact with the tracer-roller.

Constant tension of the correct amount is maintained by the weights seen at 19, and it will also be noticed that there is no possibility of the cutter removing a greater amount of material than the predetermined size, as the tendency is rather to push the work away from the cutter and against the weights.

By comparing the plan views (Fig. 2 at 23 and 26) of the work and copy respectively, it will be seen that the machine is producing opposite hand work in comparison to copy, but this is only finally determined by

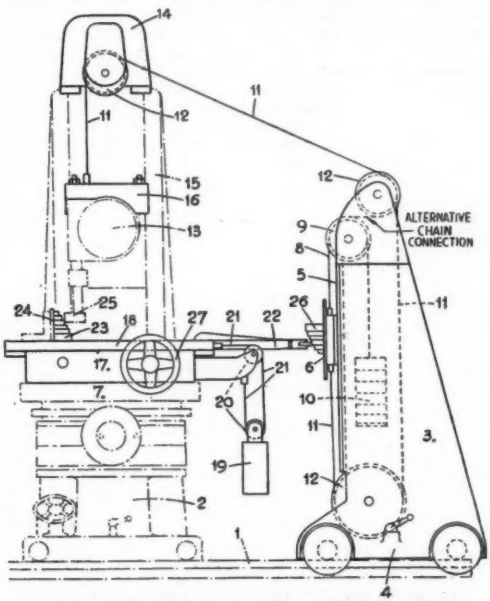


FIG. 4.—ELEVATION. APPARATUS (FULL LINE) AS FIXED TO EXISTING MACHINE (CHAIN DOTTED).

Patternmaking

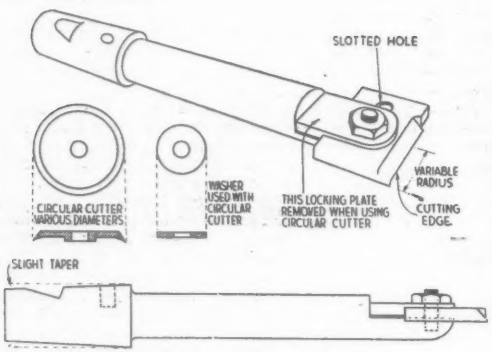


FIG. 5.—TOOL ARBOR AND CUTTERS.

the vertical movement of the cutter in relationship to that of the copy.

When both cutter and copy are arranged to move in unison, opposite hand work is produced, but, as particularly mentioned earlier, provision is made for immediate alteration of this relative movement, so that when the cutter-head is traversed down, the copy moves up and through this, a direct reproduction is effected.

Before going on to internal cutting of irregular geometrical shapes, there are a number of additional features of extensive value available in this set-up, for many other patternmaking jobs, and worth noting. For example, a flat template, Fig. 6, sufficient in thickness merely to accommodate the Tracer Roller (see sketch) and affixed to template table 6, can be made to reproduce work of any depth within the range of the rise and fall of the cutter-head (approximately 21 in. on the existing machine), by locking the template table 6, and disconnecting the movement of the main-cutter-head with that of the template table.

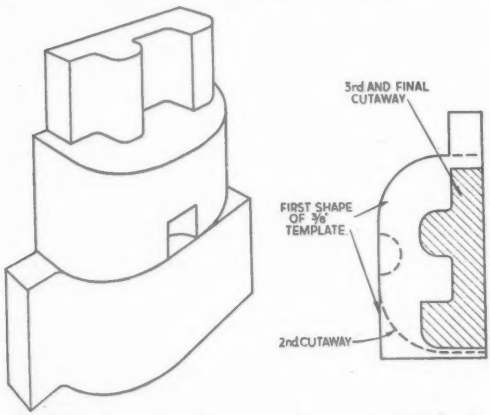


FIG. 6.—TEMPLATE—FIRST AND SUBSEQUENT FORMS WITH FINISHED PATTERN AT LEFT.

When this is done, undulating sections may be readily machined by using one simple flat cutter, and variations in dimensions of contour are obtained by a simple adjustment of the cutter diameter in comparison with the diameter of the tracer roller. A further advantage is found in the adjustment of the template table 6 and also the work-carrying angle-plate 24, which in both cases may be revolved through 90° without removing the work or the copy, detailed in Fig. 7.

A plain dome, or any variation of semi-spherical shape, is machined off a simple flat template merely by traversing the table and its followers at varying degrees across the path of the template, working only upon the rotary action of work table 24—see Fig. 8. The reason for having a rotary action also incorporated in the template table is to permit of turning difficult full-shaped copies (not templates) at 90 deg. in correct ratio to the movement of the work at 23, when an easier path for the follower-roller may be found advantageous or desirable.

It should be emphasised that full-shaped copies may be employed at any time, but templates have only been used for illustration now, chiefly because the average patternmaking job is a prototype in itself and the normal method of making templates is not upset. The tedium of making pattern match template is now passed at long last off the patternmakers' bench.

Internal Shaping

Figs. 9 and 10 show the cutting of coreboxes. These normally involve the use of templates for checking contour. This is comparatively simple when using a set-up similar to the example illustrated. This, however, may be a little misleading, as the template-copy is shown to be precisely the same size as the corebox. This would only obtain when internal templates are used in place of the external template seen in the illustration at 26, *e.g.*, that a set of templates would be made corresponding to the internal shape of the corebox in place of the external templates now being used.

The manner of performing internal cutting off an external template copy as illustrated is exactly the same as that of external cutting with the following modifications as illustrated in Fig. 11:—First, the templates are reduced in length by the diameter of the roller, this reduction being accounted for by blending the shortened ends into the highest point of the template from each end. This may give rise to a small amount of trial and error until the operator gets accustomed to the work.

It will be noted that the cutter-head of the machine has been swung over from the vertical to the horizontal and a disc type cutter is now employed in place of the flat type cutter used on external working. For the sake of patent specification, this set-up has been shown on the opposite side to the way the existing

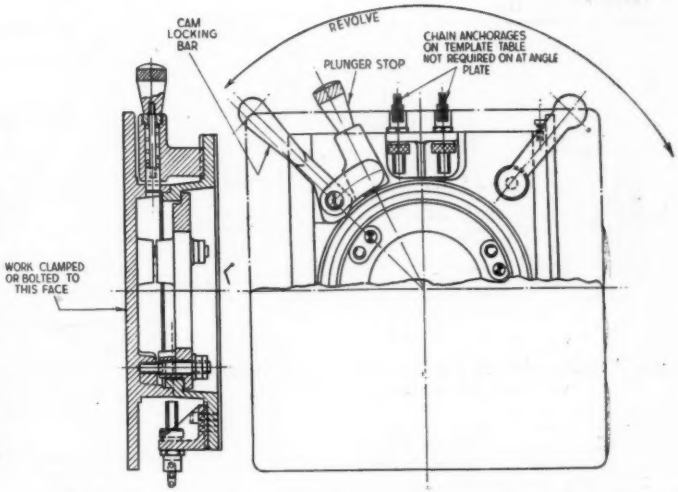

CAM LOCKING BAR
REVOLVE
CHAIN ANCHORAGES ON TEMPLATE TABLE NOT REQUIRED ON AT ANGLE PLATE
PLUNGER STOP
WORK CLAMPED OR BOLTED TO THIS FACE

FIG. 7.—DETAIL OF TEMPLATE TABLE, WHICH IS ALSO EMPLOYED ON ANGLE-PLATE WORK-TABLE.

machine will work in regard to this horizontal position, but this would not actually affect the execution of cutting shapes as illustrated.

Similar remarks regarding right and left hand reproduction apply equally to internal cutting as in the explanation given for external cutting, and it therefore follows that the operator is readily able to machine a complete right and left hand half-corebox off a single set of templates (one hand only), employing the one set-up, and merely changing the rise and fall action of the chain.

Overcoming Slight Variations in each half of a Complete Pattern or Corebox

Recognition is taken of the fact that many patterns and coreboxes have minor differences in the contour of each half, which might conceivably upset the value of the last mentioned facility. This difference can be quickly overcome by dealing with the work in a sensible manner which would allow the one set of templates to be slightly recut where further embossments are required. Fig. 6 illustrates heavy recutting.

It has not been possible to illustrate, by actual photographs or specimens, a comprehensive range of work this apparatus can accommodate, owing to the fact that, hitherto, all the tests and examples quoted have been performed on the experimental gear, and facilities have not been available to have the proper machine-made equipment built.

The following summarises the potentials of the properly-engineered machine:—

(1) *Setting-up Time.*

A matter of minutes variable downwards according to the size and complication of work, and taken that the machine is in common use for shaping irregular sections.

(2) *Range of Tools Required.*

This is quite small, especially when compared with any apparatus or machine capable of equal work (two dozen selected cutters would cover a very wide range).

(3) *Skill Necessary for Good Operating Results.*

Only the bare average as common to any pattern-maker or machinist, any of whom could grasp essential principles within half-an-hour's instruction.

(4) *Cutting Speeds.*

Average hardwoods (mahogany, teak, etc.), easy removal of approximately 2 in. × ½ in. or equal volume at the rate of 10 ft. per min. roughing cuts. Softwoods (pine and deal), 2 in. × 1 in. at 15 ft. per min, or more and soft metals say 1 in. × $\frac{1}{16}$ in. at 2 ft. per minute.

(5) *Degree of Accuracy.*

Plus-minus 0.015 in. fairly certain, and possibly considerably closer when final tests are made on an engineered machine.

(6) *Versatility.*

This apparatus is designed to machine any sizeable job which involves much template working, and will reproduce both right and left hand from one hand

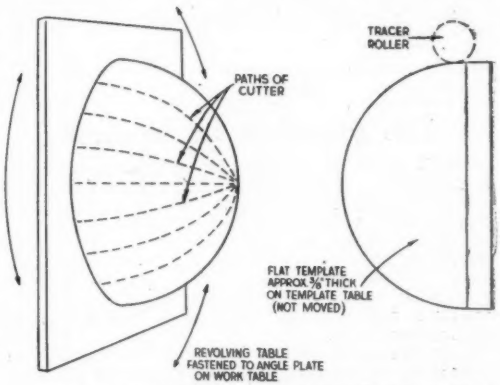
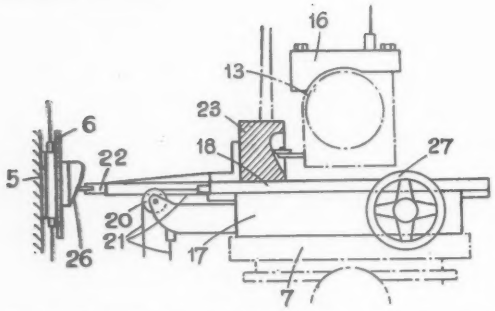

TRACER ROLLER
PATHS OF CUTTER
FLAT TEMPLATE APPROX ⅜" THICK ON TEMPLATE TABLE (NOT MOVED)
REVOLVING TABLE FASTENED TO ANGLE PLATE ON WORK TABLE

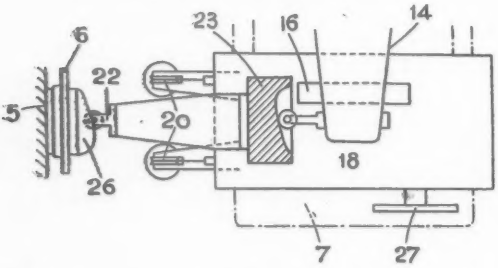
FIG. 8.—EXAMPLE OF THREE-DIMENSIONAL WORK MADE OFF FLAT TEMPLATE.

F

Patternmaking



FIGS. 9 (ABOVE) AND 10 (BELOW).—SET-UP FOR INTERNAL CUTTING OFF EXTERNAL COPY.



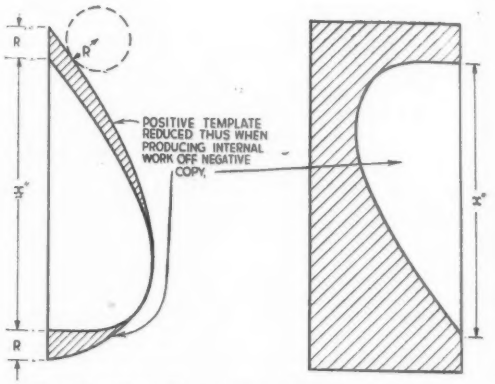


FIG. 11.—FLAT TEMPLATE TO LEFT PRODUCES WORK IN DEPTH SHOWN AT RIGHT.

set of templates. Three-dimensional cutting is also easily accomplished off a single flat template.

(7) *Controls and Safety.*

All are manual, through handwheels, etc., which are practically fool-proof. Thus there is little or no risk to the operator as neither tools nor work is handled when machining.

(8) *Gains to the User.*

Time saved in actual cutting of shaped work; elimination of the old trial and error methods, and the positive reproduction to template. There is greater accuracy with less skill, which leaves room for the better utilisation of the patternmaker's ingenuity and craftsmanship on such matters as moulding, constructional, and production problems.

In conclusion, the Author pays tribute to the pluck and co-operation of his staff in using the "Heath-Robinson" gear made for tests and trials of the equipment, and thanks the Admiralty, Portland Establishment, Wadkin, Limited, and Alfred Herbert, Limited, for the loan of illustrations.

The President in Scotland

Mr. D. H. Wood, president of the Institute of British Foundrymen, was one of the chief guests at the annual dinner of the Scottish branch. Because the Institute's chair of office was given by the late Mr. William Mayer, he took it with him and disclosed that the motto thereon was not—as was generally supposed—"Science hand in hand with labour" but "Science hand in hand with the dignity of skilled labour." This, the president averred, was much more appropriate to existing conditions.

In criticising the recent industrial "switch-off," he insisted that a mistake of the first magnitude had been made in closing down the ironfoundry industry as but 6 kW is consumed in the production of one ton of castings.

Aga Heat Sales Conference

Something of pre-war glamour was recaptured at a dinner held on March 11 as part of a conference of the distributors of Aga cookers. It was presided over by Mr. V. Jobson, who revealed that he was just as much "at home" in inculcating enthusiasm into members of the selling organisation as he was when addressing the workpeople or shareholders.

About 120 guests were assembled and listened to good speeches by Mr. G. H. Edwards, Mr. W. T. Wren, Mr. W. Mason, Mr. J. Shaw (Allied Ironfounders), and the Rt. Hon. the Earl of Huntingdon. The programme for the cabaret which followed was both exciting and colourful, but the Editor, who was among the guests, was unable to enjoy this promising fare because of transport difficulties.

Lancashire Branch Review Foundry Practice

A meeting of the Lancashire Branch of the Institute of British Foundrymen was held in the Reynolds Hall at the Manchester College of Technology on December 7th, with the branch president, Mr. W. Brown, in the chair.

A sound film, "The Production of High Quality Steel," was presented, by courtesy of Hadfields, of Sheffield, and Mr. W. H. Salmon, representing the firm, attended to answer any questions put by members in respect of the processes shown in it. (This film was described in some detail, when it was shown to the London branch.)

The vote of thanks, proposed by Mr. Throstle and seconded by Mr. Howarth, was carried with acclamation.

Mr. Salmon said that his firm felt somewhat proud of some of the steel castings they had made for aeroplanes. During the war, castings were produced for the "Hawker" people in 60-ton tensile steel, with sections down to $\frac{3}{8}$ in.

Mr. Pratt, who opened the discussion, said that his first reaction on seeing the film was one of gratitude to a firm, which was able and willing, to spend money in advertising its products and had faith in its own work. Hadfields had a good foundry, and he was disappointed to find no scene had been made of it. Could Mr. Salmon give any assurance that foundry practice would be depicted in future? It would assist in overcoming the difficulty of enlisting apprentices into foundry service. At present, the industry was faced with a blank period of probably 15 months when none would be available. Trade organisations and institutes should be recommended to obtain such films and exhibit them throughout elementary, higher grade, and technical schools to stimulate the interest of youth in what was being done.

As far as the quality of steel castings were concerned, mention had been made with regard to aircraft castings. Dr. R. Jackson, of Hadfields, had spoken upon the self-same subject 18 months previously in the Engineers' Club. It was stated that, in order to obtain a high ratio of efficiency, Hadfields were making use of X-ray control, and scrapping probably 30 per cent. of their output. Actually, to scrap 30 per cent., from the cast iron point of view, was ruinous.

Could Mr. Salmon give a few instances of Hadfields green sand technique? It was understood that some time ago they were making large manganese steel buckets in green sand. They were also using large quantities of nails at the same time. It was his good fortune, during the early part of the year, to go to America, where he saw steel being made in one-third of the time taken in this country, and it was interesting to find that the specifications were for low-alloy steel and not of the plain carbon steels. The Americans got the raw materials into the furnace, got the heat out as quickly as possible, approximately in an hour and 15 minutes, and yet they had put into the steel the quality necessary by virtue of higher manganese or higher molybdenum contents. Would Mr. Salmon say what his reaction was to that statement?

MR. SALMON said the film was definitely made for advertising purposes in order that copies of it might be sent abroad. It was the first of a series of which the production of high-quality steel was one and another included the foundry, while a further one would include the foundry in connection with colliery equipment, etc. Again, a great deal of crushing machinery was produced for use in Canada. The scripts for these were ready.

The film was being used with a view to encouraging the enrolment of apprentices, and to give them some idea of what a steel works looked like, and inducing young people not to leave a productive trade.

A present day difficulty was that it was not easy to keep boys who were well aware that at 18 years of age they would have to go into the Army. After they had served in the Forces anything might happen; they might even become farmers. They must have a definite interest in the work to keep them in the foundry.

Mention had been made of the high quality of aeroplane steel castings referred to by Dr. R. Jackson in his lecture, and of a steel ingot mould which had 85 per cent. of good material and an ordinary steel casting 65 per cent. The good material in those aeroplane castings was something like 20 per cent., 80 per cent. being added to produce a good, sound, X-rayed casting. There was nothing strange about this low yield to obtain X-ray quality in steel castings. The Americans had found exactly the same thing and the German practice followed upon similar lines.

Shortage of Bentonite

If the Government continued to restrict the importation of bentonite it was to be anticipated that the steel foundries would not be able to do more than they were accomplishing at the present time by means of green sand technique. Though there were some substitutes for bentonite they were not as good as the real thing. Another point to be considered was that bentonite gave a different surface on the mould and did not wash away easily. Even though the green sand and the dry sand test figures were the same, in the foundry there was something different between the American bentonite and the British substitute which could not be expressed in figures. A mould could not be made as well as with bentonite and green sand work could not be developed unless more bentonite were made available.

Before the war eleven tons of bentonite were used each week in their foundry, but nowadays only two tons were available.

Surface Reinforcement

A quantity of nails was put in the faces of green sand moulds, but it must be remembered that a

Lancashire Branch Review

material was being dealt with which had only the strength of 8 or 10 lb. per sq. in., and that steel was being poured on to the surface of the sand at a very high temperature. The green sand mould was easily washed away unless it was run in the easiest position. The moulder himself could make or mar the work in the green sand foundry; but if he would run from the bottom so that the steel rises gently the work was ideal. If, on the other hand, he tried to gate his moulds like a top run ingot mould, he would scour away the sand. It depended, not only upon the sand and the clays available, but also on the moulder, as to whether green sand practice in the foundry, for either iron or steel, was going to be successful.

Even on the casting side the firm were definitely using low alloy steels. This meant, of course, that the steels had to be heat-treated. It was not practicable to give the same treatment to all steels. The day had gone when there were big furnaces full of castings, just giving them 950 deg. C., and say that was the finish. Each casting had to be considered separately There had to be normalising treatments to obtain the best toughness and impact properties, and even water-quenching and steel castings for the steel to attain a tensile strength of 60 tons per sq. in. with an izod value of 40 foot-pounds.

German Practice

MR. PRATT understood, from some of the Ministry of Supply publications, that there was a German substitute for bentonite. Had Mr. Salmon any experience of it? People returning from Germany had come back with wonderful ideas of what they could do with Chamotte. Could Mr. Salmon express any view as to the difference between the Dusseldorf blue clays and the Ayrshire Chamotte clays?

MR. SALMON said there were large deposits of bentonite-like material in Kenya, and he had been informed by Mr. Walker recently that some of the Kenya material was nearly as good as bentonite. He understood that there was no pure bentonite on the Continent, and that the Germans did very little green sand work, but they did use some cement moulding and the Chamotte moulding very largely because they had the raw materials at hand. There were not large amounts of clay in Great Britain which could be rendered into Chamotte material. It had to be broken down into angular particles, and also have the correct clay to make the constituents stick together; in other words, it was making a "compo" from synthetic material.

The crucible clays used in the past for crucible pots were far better than at the present time. Chamotte was really a fireclay. It should be thought of as a lump of fireclay dug from the ground and then stacked in a cupola and fired at a high temperature till it had the hardness of a brick. During the war period it had not been possible to obtain adequate supplies of Chamotte, and therefore it was necessary to fall back upon the old Sheffield crucible pots. There was not sufficient material in England to do much Chamotte work, but in Germany they had large resources. This was the reason why in Germany and Czechoslovakia Chamotte manufacture had been developed.

German castings were very good as a rule, but there was an intermediate sort of German casting which seemed to be very bad. With regard to aeroplane castings, the opinion was that German products were not superior, or even equal, of the British and American aeroplane steel castings, except possibly that they showed very low sulphur and phosphorus contents.

Ingot Mould Life and Ladle Practice

MR. H. HAYNES (Ashton-under-Lyne), speaking as an iron founder, mentioned that his firm had produced a film showing all processes from the taking of the raw material to the transit of the castings through the foundry door. It had been shown to all employees. Their wives and children had been invited to see it, and they, too, had been very appreciative.

He would like to know whether the ingot moulds were made of cast iron and what was their life? Had any trouble been experienced in tapping metal out of the ladles when it was desired to cast into the moulds?

MR. SALMON said the cast iron moulds were made in very good quality hematite, and their life depended upon how they were treated. The best way to treat ingot moulds was to heat them and not let them go cold. A longer life could be expected if they were used regularly, not allowing them to go cold, and keep on re-heating them. They were also painted on the inside with a coating of tar in order to permit of a nice strip from the ingot.

Magnesite was used for the nozzle and clay. They had not many running stoppers in the foundry for a number of years. If the difficulty was due to the stopper then a complaint was made to the refractory man, and if it was due to the ladle man he was moved off the job. A considerable time was necessary in order to teach ladle men how to set stoppers.

The testing was done by means of sand. There was quite an art in setting a stopper, and actually until the technique was learned, there was the likelihood of trouble.

Book Review

Sheet Metal Worker's Instructor by R. H. Warn and J. G. Horner. Published by the Technical Press, Limited, "Piccancot," Gloucester Road, Kingston Hill, Surrey.

Technical progress has not invariably been advanced by the repeated re-appearance of new editions of standard textbooks. There are, however, two exceptions, patternmaking and sheet metal work. Though new machines make their appearance from time to time, the basic principles underlying the craft remain unchanged. Thus this book, now in its 7th edition, remains as fresh as when it was first written and can be recommended as a means of acquiring the simple theoretical knowledge needed to advance the artisan from the bench to a position of responsibility.

V. C. F.

I.B.F. Annual Conference

(*Continued from page* 238.)

PAPERS

WEDNESDAY, JUNE 18

Session A.

No. 874.—" Production of Ferrous Castings by Die-casting Process," by C. D. Pollard (Member), H. A. Redshaw (Associate Member), and C. A. Payne, B.Sc. (member). Qualcast, Limited.

No. 875.—" Graphite Formation in Cast Iron," by H. Morrogh (Member), and W. J. Williams, B.Sc. (Associate Member). British Cast Iron Research Association.

No. 876.—" Annealability of White Iron for the Manufacture of Malleable Cast Iron," by S. W. Palmer, A.R.I.C. (Associate Member). British Cast Iron Research Association.

Session B.

No. 877.—" Practical and Theoretical Aspects of the Feeding of Steel Castings," by S. L. Finch (Member). Catton & Company, Limited.

No. 878.—"The Production of Carbon and Alloy Steels by the Side Blown Converter Process," by F. Cousans, F.I.M. (Member).

No. 879.—" Mass Production Methods Applied to the Manufacture of Cast Steel Bomb Bodies," by P. H. Wilson, O.B.E., M.I.Mech.E. (Senior Vice-President). Stanton Ironworks Company, Limited.

THURSDAY, JUNE 19

Session C.

No. 880.—" Control of Bronze Melts for the Production of Pressure Tight Castings," by W. A. Baker, B.Sc., A.I.M. (Member). The British Non-Ferrous Metals Research Association.

No. 881.—" The Precision Casting of High Melting Point Alloys Containing Nickel," by H. Evans, A.Met., F.I.M., P. S. Cotton, B.Sc., and J. Thexton, A.Met., A.I.M. The Mond Nickel Company, Limited.

No. 882.—American Foundrymen's Association Exchange Paper on the subject of Precision Casting. (*Title and author to be announced later.*)

Session D.

No. 883.—" The Influence and Effect of Production Flow on P.M.H. in General Engineering Ironfoundries," by R. C. Shepherd (Member). Ruston & Hornsby, Limited.

No. 884.—" Some Notes on the Surface Drying of Moulds," by A. Cracknell and F. Cousans, F.I.M. (Member).

New Catalogues

Engineering Products. It was found difficult to devise a suitable caption for the latest catalogue, received from Davidson & Company, Limited, of Belfast, which bears the title " Sirocco Products." Few catalogues issued by engineering concerns are so interesting from the foundryman's point of view. Herein is described and illustrated the plant for blowing his cupolas; for extracting dust; for ventilating and heating his shops and for spring cleaning by means of industrial vacuum cleaners. Each item illustrated carries the reference number of the appropriate detailed catalogue. The brochure is available to readers on application to the firm's new London office: Morris House, Jermyn Street, W.1.

Precision Grinding Machines. The Churchill Machine Tool Company, Limited, Broadheath, Manchester, have just released three new publications all dealing with some form of precision grinding. A three-page leaflet covers roll grinding; a 20-page brochure illustrates and describes a range of centreless grinding machines, emphasis being laid on operation details, and finally an eight-page pamphlet detailing the " OH " model semi-universal grinding machine.

Ventilating Fans.—Keith Blackman & Company, Limited, of Millmead Road, Tottenham, London, N.17, have sent us a leaflet which illustrates and describes the " K.B. Extravent fan," which, installed in a window frame, will supply or displace 11,500 cub. ft. of air per hour. It carries a year's guarantee and is moderately priced.

Publications Received

British Railways—Facts and Figures. Obtainable from British Railways Press Office, 2, Palace Chambers, Bridge Street, London, S.W.1.

Whilst not so elaborate as earlier publications, this pocket-size booklet well maintains the high level of interest of its predecessors. As youngsters take a special interest in railways, parents amongst our readers can ensure a quiet Sunday afternoon by procuring a copy. They can do so by writing to the publishers and mentioning the FOUNDRY TRADE JOURNAL.

The Industrial Law Review, Vol. I, No. 9. Published by the Thames Bank Publishing Company, Limited, 1773, London Road, Leigh-on-Sea, Essex. Price 2s.

This issue carries but one article on " A National Wages Policy," by C. A. Lidbury. The author stresses the potentialities of the American Point Rating method, but we doubt if such a scheme would work as satisfactorily in this country as piece work. Moreover it is not based on as scientific a foundation. The author does not tackle adequately the problem of unskilled and semi-skilled men having a better filled wage packet than the skilled man, or the wage levels between industry and industry. Yet there is much sound sense in his article. It will be studied, with profit, by those whose job it is to meet these incessant wage demands, for what is revealed is, in places, applicable.

Obituary

MR. SAMUEL K. SLATER, brassfounder and metal merchant, of Hurst Hill, Bilston, Staffs, died on March 14 at the age of 79.

MR. CHARLES ALFRED BROWN, who died suddenly on March 11, was London director of William Bain & Company, Limited, Lochrin Ironworks, Coatbridge, Lanarkshire.

MR. HUGH WALLACE AITKEN, who died recently, retired from active business in 1929. He was associated with H. W. Aitken Company, Limited, sugar machinery specialists, Colonial engineers and exporters, of Paisley. He was prominently identified with the design and construction of machinery used in the manufacture of cane sugar.

MR. FRANK MEDLEY, who has died suddenly at the age of 62, was a director of Henry Rogers, Sons & Company, Limited, exporters and machinery contractors, etc., of Wolverhampton. He had travelled extensively in South America, and had an intimate knowledge of Brazil. He returned from a six weeks' visit to Brazil in November of last year. Mr. Medley had been president of the Wolverhampton Chamber of Commerce for two years.

MR. WILLIAM R. HOLLAND, of the a.c. engineering department of the British Thomson-Houston Company, Limited, Rugby, died on March 10 after a long illness. He joined the company in 1916. He was transferred from the test department to the a.c. engineering department in 1920, becoming head of the section dealing with the design of all types of synchronous machines in 1922. One of his most successful designs was the salient pole synchronous motor with slip-ring type winding in the faces of the poles and known as the A.M.T. type, which he patented in 1933.

Surplus War Equipment

George Cohen, Sons & Company, Limited, have signed a contract with the Ministry of Supply for the acquisition of the whole of the plant and equipment accumulated at the main collection depot for war surplus at Avant-Port, Brussels. The purchase includes a vast amount of unused engineering equipment and stores, notably electric generating sets, transformers, pumping equipment, petrol-driven charging sets, outboard motors for small craft, and the like. The plant will be available for export from Belgium. Items can be imported into Great Britain providing an import licence is obtained. Such licences will also be necessary in respect of domestic transactions in Belgium.

THE ABERDEEN, DUNDEE and East Coast Associations of Shipbuilding Employers have amalgamated into one association, to be known as the Scottish East Coast Shipbuilders' Association. Mr. A. Aikman, managing director of the Grangemouth Dockyard Company, Limited, has been appointed president for the current year. The secretary is Mr. J. M'Ilwraith, 105, West George Street, Glasgow.

Parliamentary

Mineral Resources of the United Kingdom

MR. LAVERS asked the Minister of Fuel and Power what steps were being taken to explore and develop lead and zinc in the North Pennines.

The MINISTER said he had already appointed a committee to inquire into the resources of certain minerals in the United Kingdom, including lead and zinc, and to recommend means for their economic development. He proposed to await the report of this committee before considering any further action.

Asked by MR. LAVERS if, since it would be economic for the country, and in view of the fact that experts were of the opinion that this was a sound economic proposition, he would treat it as a matter of urgency, MR. SHINWELL said he set up this committee some time ago, but he directed them to inquire first into the possibility of tin exploitation, which was regarded as extremely important, but they would, of course, address themselves with urgency to other matters.

Export Licensing Control

Supply considerations have rendered it necessary to impose export licensing control on steel conduit tubes for electrical wiring, plane blades, ferro-alloys, and chromium and tungsten in certain forms. The provisions for this are made by a new Board of Trade Order which comes into operation on March 24.

The additions to the schedule of goods requiring export licences are:—Group 6 (1): Ferro-alloys, whether briquetted or not; tungsten ores and concentrates; steel conduit tubes for electrical wiring; chromium and tungsten have been added to the list of non-ferrous metals and alloys. Group 6 (2): Blades or irons for planes of metal or wood.

Platinum and alloys containing platinum in the forms specified in Group 6 (1), and articles made wholly or mainly of platinum may in future be exported without licence when exported as merchandise by sea or air freight or by parcel post or insured box post.

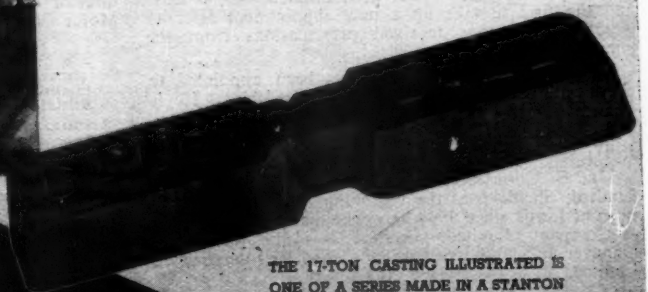
Aluminium Moving Bridge

Head, Wrightson & Company, Limited, have received a contract from the River Wear Commissioners for the supply and erection of a twin-leaf bascule bridge to be manufactured in aluminium alloy—the first aluminium moving bridge in the world. The contract follows a year's development work by a subsidiary company, Head, Wrightson Light Alloy Structures, Limited. When open the bridge will give a clear waterway of 90 ft. It is stated that a considerable saving of steel has been effected by the employment of aluminium.

BRAITHWAITE & COMPANY (ENGINEERS), LIMITED, have received a contract from the Egyptian Government for a 60-in. steel pipe to carry water eight miles. Their tender for £694,000 was stated to be the lowest received.

STANTON-DALE
REFINED PIG IRON

Manufactured to guaranteed analyses in seven standard grades. Also obtainable to individual specification



THE 17-TON CASTING ILLUSTRATED IS ONE OF A SERIES MADE IN A STANTON FOUNDRY FROM STANTON DALE IRON

1. Core being lowered into mould
2. Pouring the metal
3. Finished casting in transit

The
STANTON IRONWORKS
COMPANY LIMITED
NEAR NOTTINGHAM

Personal

MR. K. FRASER has been appointed a director of Babcock & Wilcox, Limited.

MR. R. ALLEN, London manager of the company, has been appointed a director of J. Samuel White & Company, Limited.

MR. H. H. HARLEY, founder and chairman of the Coventry Gauge & Tool Company, Limited, received gifts from employees at a gathering to celebrate his 70th birthday.

MR. V. W. BONE has been appointed deputy chairman in addition to his position as managing director of Ruston & Hornsby, Limited. MR. E. W. SPALDING and MR. V. R. PREHN have been appointed directors of the company.

MR. JAMES PETRIE, former financial secretary and staff superintendent of Colvilles, Limited, who is leaving the firm to take up a new appointment after 45 years' service, has received presentations from the management and staff.

SIR WILLIAM JOHN TALBOT has been appointed to the position of High Sheriff of Staffordshire. He is chairman of the Talbot-Stead Tube Company, Limited, Walsall, and of the Chesterfield Tube Company, Limited. He was knighted in 1935.

MR. F. COUSANS is joining the staff of Hadfields, Limited, Sheffield, at the beginning of April. He has been at Leeds since 1944 as works manager for Catton & Company, Limited. From 1924-44 he was works manager at Scunthorpe for Thos. Firth & John Brown, Limited.

MR. CYRIL M. COHEN, managing director of George Cohen, Sons & Company, Limited, has been appointed chairman. He remains managing director and succeeds MR. LAWRENCE LEVY, who is to remain on the board. Mr. Cohen is a grandson of George Cohen, who founded the firm in 1834.

MR. K. F. CARMICHAEL has relinquished the managership of the Burntisland Works of the British Aluminium Company, Limited, to take up an appointment in Tasmania. He is succeeded by MR. L. A. LAWRENCE, who was assistant manager at Burntisland before going to Newport (Mon).

PROF. WILLIAM KERR, who retired from the Chair of Civil and Mechanical Engineering and Applied Mechanics at the Royal Technical College, Glasgow, at the end of last year, received presentations, including a cheque, at a complimentary dinner in Glasgow. He said that he wished the money to be used to set up the "William Kerr Fund for Engineering Students" at the college.

MR. WILLIAM HINCHCLIFFE, chief superintendent engineer and naval architect for Ellerman Lines, Limited, for 23 years, and managing director of the Ellerman Engine Works, Limited, Liverpool, is retiring at the end of the month. He is also a director of Amos & Smith, Limited, marine engineers, etc., of Hull, and of C. & H. Crichton (1921), Limited, engineers, etc., of Liverpool.

MR. WILLIAM SCOTT has been adopted Conservative candidate in the Parliamentary by-election at Jarrow caused through the death of Miss Ellen Wilkinson. He is managing director of Sir W. G. Armstrong Whitworth & Company (Ironfounders), Limited, Armstrong Whitworth & Company (Pneumatic Tools), Limited, Jarrow Metal Industries, Limited, Jarrow Engineering & Shipbreaking Company, Limited, and a director of Jarrow Tube Works, Limited. He is 49 years of age.

MR. D. LACY-HULBERT, who has been appointed director of production of the precision tubes division of Tube Investments, Limited, was formerly works director of the subsidiary company, Tubes, Limited. MR. E. D. E. ANDREWES has been appointed a director and general manager of Tube Investment's export organisation, T.I. (Export), Limited. MR. ARTHUR CHAMBERLAIN has been appointed deputy managing director of the subsidiary company, Hercules Cycle & Motor Company, Limited.

Wills

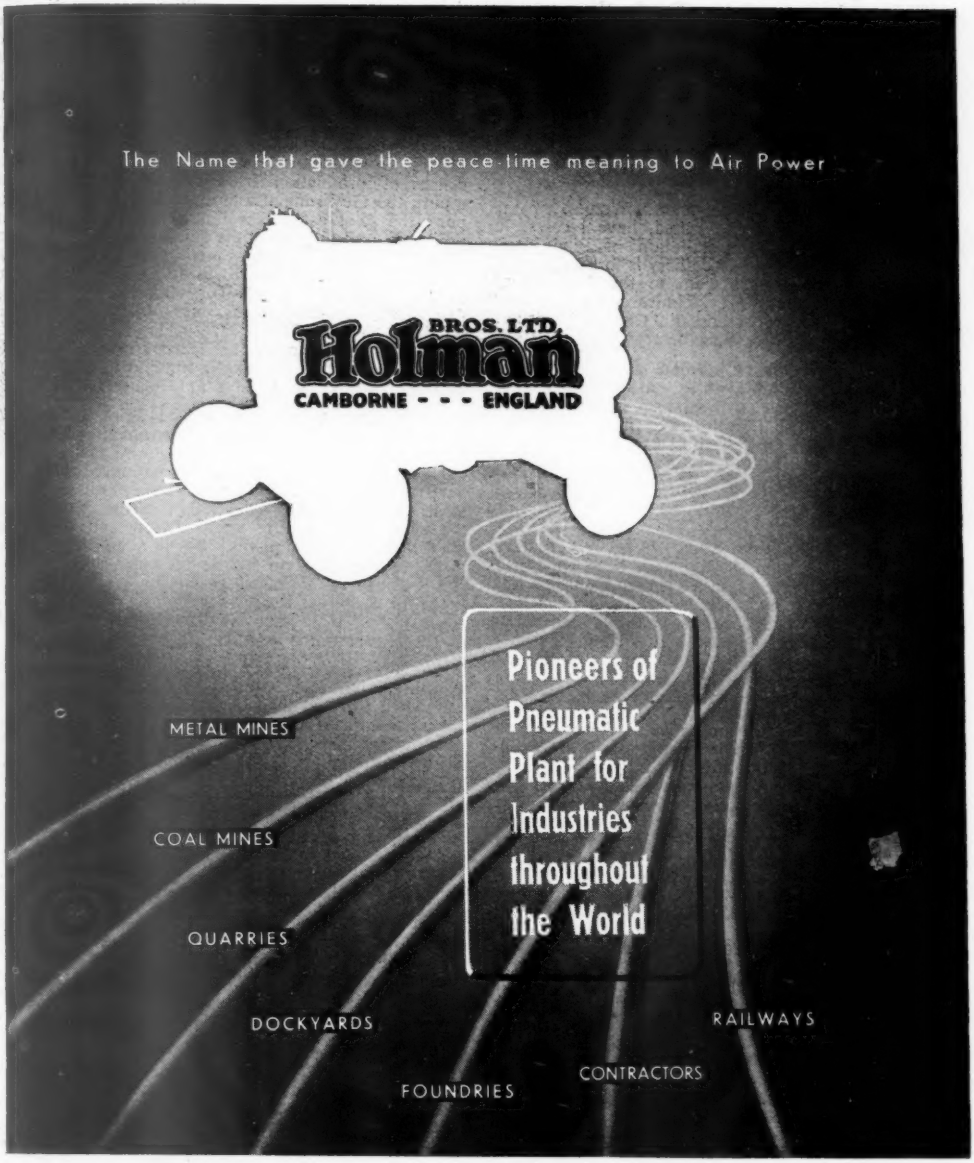
STOTESBURY, S. J., a director of Robert Stotesbury, Limited, manufacturers of engineers' supplies, of Bristol £27,591

TWEEDALE, NORMAN, joint managing director of Tweedales & Smalley (1920), Limited, textile machinery makers, of Castleton, Rochdale ... £123,924

New Works for T. C. Jones & Company

T. C. Jones & Company, Limited, Wood Lane, Shepherd's Bush, London, W.12, which is associated with George Cohen, Sons & Company, Limited, is shortly to open a new works for the production of structural steelwork and steel reinforcements at Treorchy, Glam. The works has been erected at a cost of £350,000, and will ultimately provide employment for about 600 workers. The works comprises two main shops. The structural shop will undertake the fabrication of steelwork of all classes, while the reinforcement shop will engage in the production of shaped mild-steel bars and the manufacture of welded mesh. There will also be a steel stock section. The planning, designing, fabrication and erection of the works have been carried out entirely by T. C. Jones & Company.

Contracts for the constructional steelwork for 16 other factories in South Wales, involving 2,256 tons of steelwork, have already been placed with the company. Ten of these are for "advance" factories, built in advance of letting, and two are for silicotic miners, all of which come under the Government's scheme for financing 136 factories to help unemployment in South Wales. The other four are for private companies. Construction of the new Treorchy factory is partly Government financed, but the whole of the plant and installations was financed by the company. Preference for employment will be given, where possible, to ex-miner silicotics.



LONDON OFFICE: BROAD STREET HOUSE E.C.2

News in Brief

THE MINISTRY OF SUPPLY, to help meet the heavy demands for lead, are recovering as much as possible of the undersea cable used during the war for Operation Pluto and which carried petrol from this country under the English Channel. The cable has a high lead content and it is anticipated that the full quantity of lead to be recovered will be about 15,000 tons.

FRASER & CHALMERS ENGINEERING WORKS, of the General Electric Company, Limited, have received a contract for an extensive installation in Bihar Province, India. An entirely new colliery is to be equipped from the level of the coal seam to the despatch of the treated coal. The plant includes a steam power station, bunkers, conveyors and a "Chance" washer. The value of the contract is in the region of £250,000.

THE MINISTRY OF SUPPLY intimate that a number of Diesel engines are available which can be used directly to drive machines such as compressors, or shafting. Companies able to use Diesel power in this way may choose from engines ranging in sizes from 40 to 400 h.p. at 1,000 r.p.m. Interested firms should write to Ministry of Supply, Dept. R.E.4, Bush House, South-West Wing, Strand, London, W.C.2, giving details of their requirements.

THE ROCKWELL MACHINE TOOL COMPANY, LIMITED, 83, Euston Road, London, N.W.1, have been appointed by Vickers-Armstrongs, Limited, manufacturers of V.S.G. variable-speed hydraulic-transmission units and pumps, as their sole selling agents in the United Kingdom for all industrial applications. The Rockwell Machine Tool Company have set up a specialised department to offer advice and technical service in connection with hydraulic-transmission problems.

A CAMPAIGN TO BRING to the notice of the small men in industry that 40,000 surplus machine tools are available for purchase is being conducted by the Ministry of Supply. The Ministry has already disposed of over 110,000 machine tools for £28,000,000. Although large users have had their needs met, many small men are still requiring machine tools. Disposal centres, at which details of the machine tools available can be seen, have been set up in various parts of the country.

COPIES OF THE particulars of sale, the special conditions of sale and the tender form may be obtained on application to the Trading with the Enemy Department (Treasury and Board of Trade), T.E.4(A), 24, Kingsway, London, W.C.2, in connection with the Board of Trade's invitation to tender for the purchase of shares in certain companies, including Henry Pels & Company, Limited, Aug. Brehmer's (British) Successor, Limited, A.E.G. Electric Company, Limited, Kent Nail Works, Limited, Magna Wire & Cable Company, Limited, and Nico Manufacturing Company, Limited.

A LOCOMOTIVE WHICH has been in continuous service for nearly 70 years is to be exhibited in the Newcastle Science and Engineering Museum. It is an 0-4-0 Black Hawthorne locomotive, the only surviving example of the earliest type of industrial locomotive designed by that company. It was built in 1874 and used at a works in Hebburn until 1943 when the works were closed and sold to George Cohen, Sons & Company, Limited, for dismantling and disposal. George Cohen & Company presented the engine to the North-Eastern Historical Engineering and Industrial Society.

THE GOVERNMENT HAS DECIDED to postpone the census of production from 1948 until 1949. Last month the Government announced its decision to postpone the pilot census on distribution from this year until next and to put off the full census of distribution until 1950. These changes mean that the pilot census, when it is taken next year, will be based on the present year and the full census for distribution will relate to 1949. The production census taken in 1949 will be based on 1948. The Board of Trade states that this decision does not affect the partial census for 1946, and manufacturers are urged to send in their returns as soon as possible.

FOLLOWING A MEETING of the Joint Consultative Committee representing the Government, the British Employers' Confederation and the T.U.C. General Council, the Ministry of Labour announced that it had been decided to set up a new sub-committee to keep under constant review industrial problems arising out of the need for staggering working hours to spread the burden on electricity plants. Further consideration was given to the problem before industry consequent on the shortage of electrical generating plant. Reports from the Regional Boards for Industry throughout the country showed that substantial progress has been made in the consideration of the problem regionally.

AS FROM JULY 1 NEXT, the Scottish business of the British Aluminium Company, Limited, will be transacted through their own Scottish branch office to be opened in Glasgow. Alexander Brown & Company, who have acted as the selling agents of the British Aluminium Company in Scotland for over 50 years, will be relinquishing the agency, but will continue to act as principal stockists in Scotland for the products of the company. The Scottish branch office of the British Aluminium Company will be located at the same address as Alexander Brown & Company—113, West Regent Street, Glasgow, C.2. Mr. P. J. Ferguson has been appointed manager of the branch.

CIRCULARS HAVE BEEN ISSUED to stockholders of Metal Industries, Limited, convening a meeting for March 31 to increase the capital from £2,750,000 to £4,750,000 by the creation of 500,000 "B" ordinary shares of £1 each and 1,500,000 3¼ per cent. cumulative second preference shares of £1 each. It is intended to issue 300,000 "B" ordinary shares to stockholders in the proportion of seven "B" ordinary shares for every £50 of "A" and "B" ordinary stock or part thereof held on March 15, 1947, any fraction of a share arising in the computation being ignored. The 3¼ per cent. preference shares will be issued to the public. The issues are to provide for the considerable capital expenditure required for developments in hand.

THE UNITED STEEL COMPANIES LTD

WORKINGTON CYLINDER IRONS

The requirements of engine cylinders, whether for the automobile or the massive marine diesel, can be met from the Workington range of special cylinder irons. And not, of course, cylinders alone, but all engineers' castings requiring the same properties of soundness, hard wearing and ready machinability. All Workington Irons are supplied in the machine-cast form, easily handled, uniform, sand free and without waste. "UCO" Refined Irons, made from virgin blast-furnace metal without re-melting or the addition of scrap, are supplied for the requirements of "high-duty" specifications.

WORKINGTON IRON & STEEL COMPANY

WORKINGTON Telephone: Workington 206 Telegrams: "Mosbay," Workington CUMBERLAND

Branch of The United Steel Companies Limited.

W. 76.

Company News

(Figures for previous year in brackets.)

Lobnitz & Company—Dividend of 8% (nil).

Beyer, Peacock & Company—Dividend of 5% (nil).

Irish Aluminium Company—Dividend of 5% (6¼%).

Amalgamated Metal Corporation—Dividend of 3¼% (same).

Alexander Stephen & Sons—Interim dividend of 7% (same).

Humphreys—Dividend of 15% (same) and bonus of 2½% (nil).

J. Samuel White & Company—Interim dividend of 5% (same).

Beans Industries—Final dividend of 27½%, making 37½% (same).

Ketton Portland Cement Company—Interim dividend of 5% (same).

Thomas Heiton & Company—Interim dividend of 3s. per share (same).

A. A. Jones & Shipman—Dividend of 10% and bonus of 5% (same).

Chinnor Cement & Lime Company—Final dividend of 10% (5%), making 15% (7½%).

Robert Stephenson & Hawthorns—Dividend of 5% (same) and tax-free bonus of 2% (nil).

G. D. Peters & Company—Final dividend of 7½% and bonus of 2½%, making 17½% (same).

R. W. Crabtree & Sons—Dividend of 8% (same) and capital bonus of 5%, tax free (same).

John C. Parkes & Sons—Dividend of 6¾% (same) and bonus of 3¼% (nil), making 13¼% (10%).

Associated Electrical Industries—Final dividend of 7½%, making 12½% (10%) and bonus of 2½% (nil).

Trussed Concrete Steel Company—Dividend of 9% on the 6% preference shares for the 18 months ending March 25, 1947.

Taylor Tunnicliff (Electrical Industries)—Net profit for 1946, £47,378 (£31,470); dividend of 12½% (10%); forward, £229 (same).

Waygood-Otis—Profit for 1946, after depreciation, etc., £38,553; final dividend of 10%, making 20% (25%); forward, £16,924 (£15,208).

Charles Clifford & Son—Second interim dividend of 12½%, tax free (same); no final dividend is to be recommended and the total for the year is 17½% (same).

Coltness Iron Company—Second interim dividend of 16¾% (same), making 21¼% (same). The directors do not intend recommending any further dividend for 1946.

Ratcliffs (Great Bridge)—Net profit for 1946, after taxation, etc., £38,728 (£28,770); final dividend of 20%, making 35% (33¼%); to reserve, £17,000 (nil); forward, £58,890 (£58,031).

Ingall, Parsons, Clive & Company—Net profit for the year ended September 30, £10,490 (£12,283); to general reserve, £5,000 (same); dividend of 10% (same); forward, £14,652 (£14,918).

Edwin Showell & Sons—Net profit for the year ended June 30, after taxation, etc., £8,348; dividend of 10% and bonus of 10%; to general reserve, £4,000; forward (subject to directors' fees), £11,483 (£4,685).

John Baker & Bessemer—Balance for 1946, after providing £147,126 (£66,620) for E.P.T. and income-tax, £67,231 (£29,882); dividend of 10% (same) and bonus of 5% (nil); forward, £78,020 (£39,848).

James Booth & Company—Net trading balance for 1946, £138,445 (£158,543); dividend of 15% (same); to staff fund, £5,000 (same); re-equipment and development, nil (£50,000); forward, £224,395 (£158,985).

Spencer (Melksham)—Net profit for the year ended September 30, after taxation, depreciation, etc., £18,167 (£15,997); to sinking fund reserve, £6,750 (£6,250); dividend of 10% (same); co-partnership scheme, £670; forward, £42,814 (£35,852).

Clayton Dewandre Company—Net profit for 1946, after E.P.T., income-tax, etc., £40,506 (£39,036); to general reserve, £7,500 (same); final dividend of 6% (same) and bonus of 2% (nil), making 12% (10%); forward, £18,218 (£17,972).

Radiation—Accounts for 1946 show income from subsidiary companies, £295,083 (£293,078); less tax, £132,787 (£146,539); leaving £162,296 (£146,539); add fees and bank interest, £574 (£922); dividend of 10% (same); forward, £162,871 (£160,330).

North British Locomotive Company—Net profit for 1946, after £110,000 (£100,000) for tax, £20,000 for other specific purposes (£30,000 for depreciation) and £66,895 (£50,000) to reserve, £51,617 (£57,404); dividend of 5% (same); forward, £51,340 (£54,722).

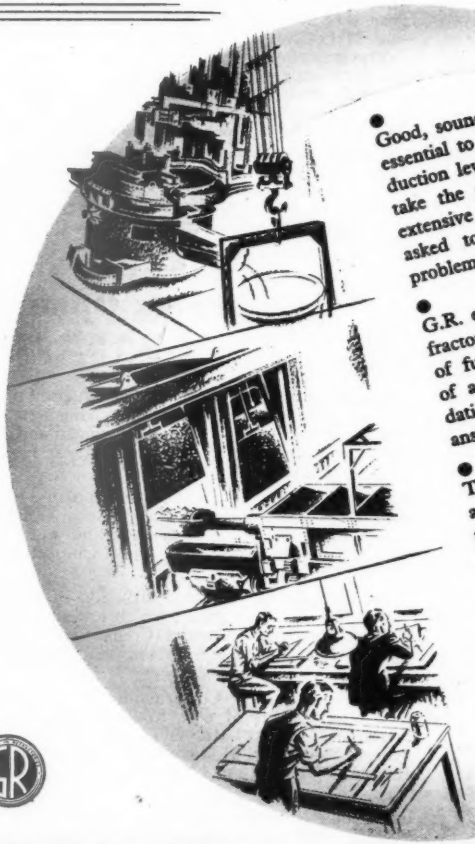
Rivet, Bolt & Nut Company—Net profit for 1946, after £27,686 (£21,962) for depreciation, £60,894 (£45,710); to reserve, £10,000 (same); employees' benefit account, £5,000 (same); dividend of 15% (12½%); forward, subject to directors' fees, £13,802 (£12,847).

Steel Barrel, Scammells & Associated Engineers—Net profit for the year to June 30, after tax, depreciation, etc., £24,746 (£24,015); to general reserve, £5,000 (same); development reserve, £2,000 (same); dividend of 15% (same) and bonus of 5%; forward, £5,116 (£5,086).

British Engine Boiler & Electrical Insurance Company—Premium income, etc., for 1946, £1,044,720 (£939,688); claims and outgoings, £921,924 (£862,947); credited to profit and loss, £80,783 (£74,699); final dividend of 17s. per share, making 34s. per £5 share; forward, £300,974 (£237,564).

R. B. Pullin & Company—Trading profit for the year ended September 30, including E.P.T. repayable (estimated at £30,000), £44,352 (£60.881); depreciation, £8,441 (£9,054); deferred repairs, £1,000 (same); income-tax, £16,859 (£37,975); to general reserve, £5,000 (£4,000); dividend of 12½% (17½%); forward, £6,837 (£860).

Practical men give practical help wherever Refractories are used



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Raw Material Markets

Iron and Steel

The drop in pig-iron production is peculiarly ill-timed. Before the emergency the need for bigger outputs to sustain the rising scale of activity in the foundry trades was clearly indicated, and short deliveries of pig-iron must adversely affect the production of castings during the next few weeks. Most of the foundries have drawn heavily on their pig-iron stocks and are now using cast-iron scrap in larger quantities to eke out their meagre supplies of high-phosphorus iron. High-phosphorus iron is in most urgent request, but hematite, refined and low- and medium-phosphorus grades are also wanted in larger tonnages for the production of engineering and special castings.

One of the principal bottlenecks in the steel industry has been the deficiency in the output of ingots and semi-finished material. Supplies are still wholly inadequate to engage the full capacity of the mills, but there is hope of improvement next month when the agreement for the continuous working of the melting furnaces comes into operation. As to the arrival of the first consignments of Belgian billets recently purchased by the Control, no precise information is yet available, but these also will help to relieve the stringency to some small extent. Meanwhile, however, re-rolling operations are restricted and even the sheet mills are running short of slabs and bars.

Relatively little progress has yet been made with the clearance of the swollen stocks of material which are awaiting delivery. Shipyards and other industrial plants in close proximity to the steelworks have been able to get through their normal quotas, but the floods following upon the freeze-up have gravely interfered with the long-distance transport of heavy steel, and the congestion of stocks at the steelworks is holding up production. Conditions at the moment are, in fact, very confused, but the broad fact emerges that a shortage of steel is holding up industrial recovery in many directions. Most of the sheet, plate and section mills have at least six months' work in hand and there are equally long waiting periods for rails, etc. Special priority is given to the requirements of the collieries also, and it looks as though the bigger proportion of export orders in hand will be relegated to the tail end of the queue.

Non-ferrous Metals

In his review for 1946, Mr. A. Bean, Chief Inspector of Mines of the Malayan Union, attributes the disappointing rate of recovery in the tin industry to inadequate coal supplies, delay in delivery of plant and equipment from overseas, and lack of maintenance of power stations by the Japanese. Other factors retarding rehabilitation, he says, are the high cost of labour and labour troubles, food shortage, and lawlessness, which has deterred the Chinese from restarting mines, especially in the remoter districts. Mr. Bean expresses the view that the coal situation is likely to have a serious retarding effect on production in the first half of 1947. By the end of 1946, there were 216 mines operating of which 18 were dredges, against a total of 1,000 mines and 100 dredges in 1940. Twenty-five dredges are in course of reconstruction.

Refined lead consumption in the United Kingdom in December was 15,000 tons, making a total for 1946 of 218,400 tons. against 237,400 tons in the previous year. Consumption in 1938 was 324,000 tons.

United Kingdom consumption of virgin zinc in December amounted to 18,000 tons. The total for the year was 216,000 tons, which compares with 172,800 tons in 1945.

The price of virgin aluminium in ingot or notch bar form was increased from £72 15s. to £80 per long ton, delivered into consumers' works, as from Monday last. The new price applies to metal of a purity of 99 per cent. to 99.5 per cent. inclusive, with the following premiums for higher purities:—Minimum 99.6 per cent., £88 per ton; 99.7 per cent., £92; 99.8 per cent., £97; 99.9 per cent., £130; 99.99 per cent., £180. The increase in price enables the Ministry of Supply to average out the cost of metal purchased at home and abroad.

Contracts Open

Any date given is the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Bishop's Stortford, April 8—Construction of foul and surface-water sewers and water mains, etc., for the Urban District Council. The Engineer and Surveyor, The Council House, Bishop's Stortford, Herts. (Fee £2 2s., returnable.)

Chippenham, April 5—Construction of soil and surface-water sewers, etc., for the Town Council. Mr. C. R. Phillips, borough surveyor and water engineer, The Old Palace, 10, Market Place, Chippenham, Wilts. (Fee £2 2s., returnable.)

Portland, April 12—Reconstruction of a sea outfall with 12-in. dia. steel tubes, which are stored ready for use, for the Urban District Council. John Taylor & Sons, Artillery House, Westminster, London, S.W.1. (Fee £5, returnable.)

Stafford, April 9—Construction of sewage and surface water sewers of 6-in. to 21-in. dia., etc., for the Borough Council. Mr. T. H. Higson, borough engineer and surveyor, Mount Street, Stafford. (Fee £5 5s., returnable.)

Swale, April 9—Construction of 1,660 yds. of 4-in. dia. spun-iron rising main, etc., for the Rural District Council. Mr. L. A. Randerson, engineer and surveyor, 48, Bell Road, Sittingbourne. (Fee £3 3s., returnable.)

Swansea, April 5—Provision, laying and jointing of 250 yds. of 12-in. dia. and 250 yds. of 18-in. dia. spun-iron concrete-lined water main, etc., for the Corporation. Mr. T. Price, engineer and manager, Guildhall, Swansea. (Fee £5 5s., returnable.)